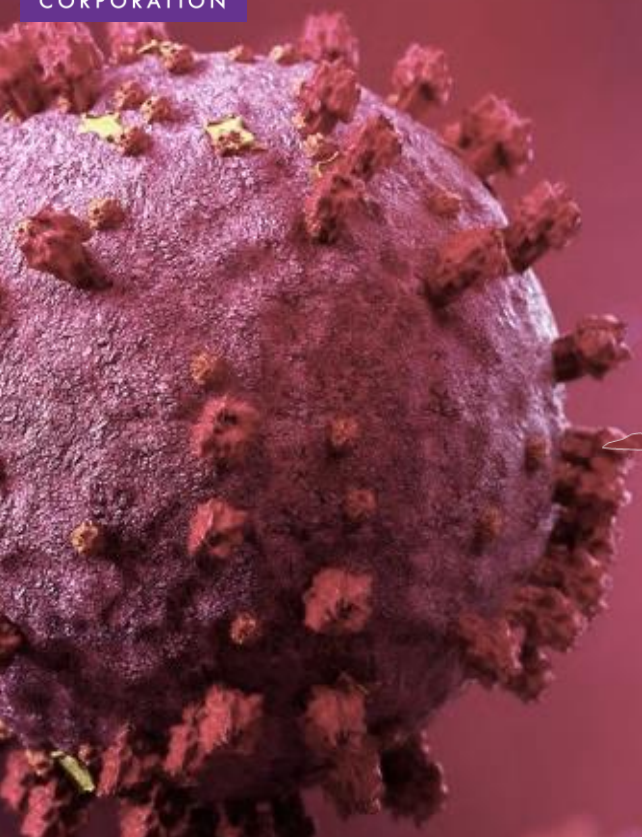


VIRGINIA

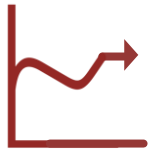
COVID-19 Update December 17th, 2020

Carter C. Price, Ph.D.

A team of RAND researchers was asked by the Commonwealth of Virginia to review available information on COVID-19 models of the Commonwealth to determine the strengths and weaknesses of each model and their relevance to decisionmaking. The information in this presentation is intended to keep policymakers abreast of the latest findings of the research team.

This research was sponsored by the Commonwealth of Virginia and conducted by the RAND Corporation. RAND is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest. For more information, visit www.rand.org.

Bottom-Line Up Front



Virginia's total case levels remain very high

- The case growth rate has continued to be very high
- Hospitalizations continue to rise rapidly
- Testing has risen but not fully kept up

Key triggers will continue to drive a rapid rise for the coming months

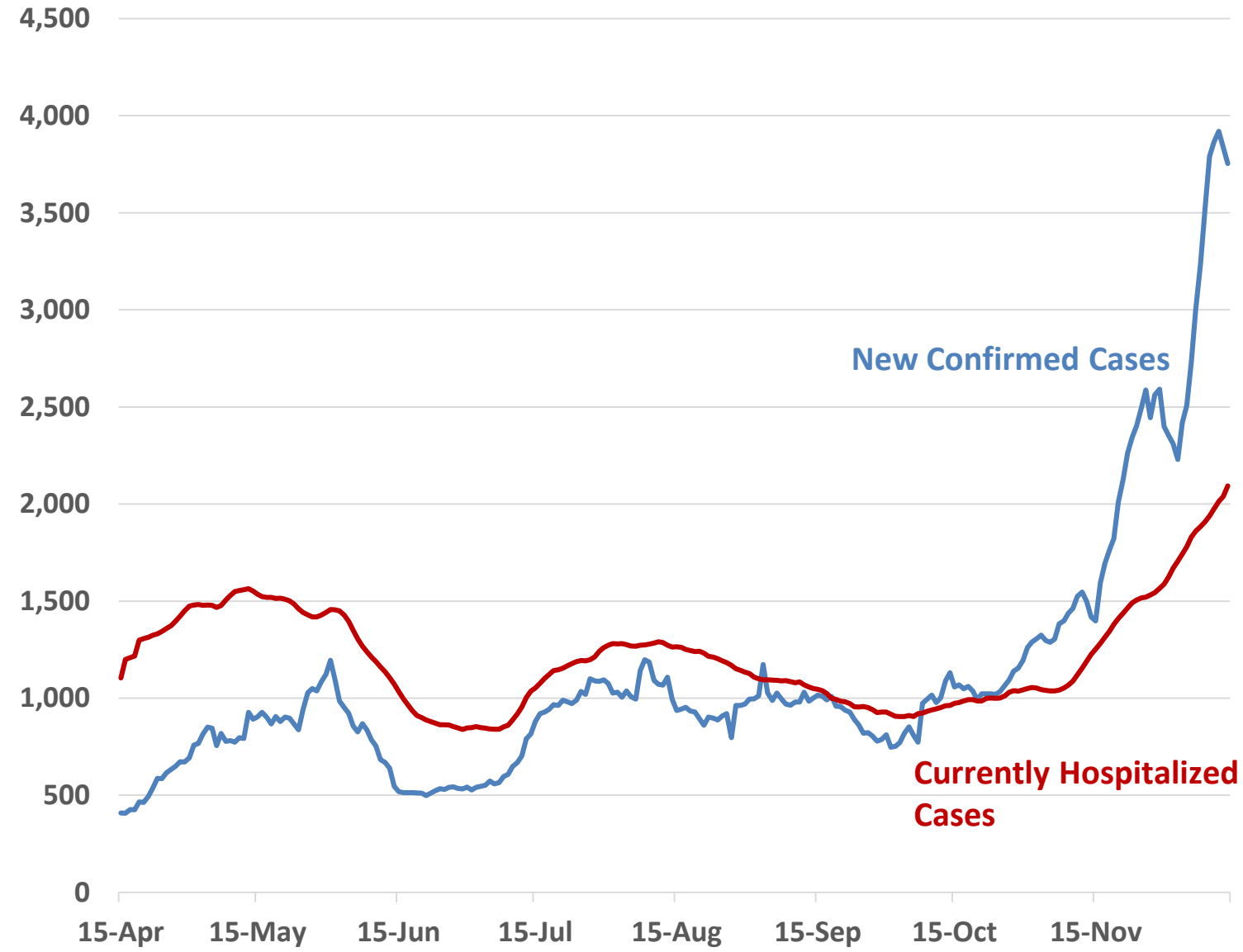
- Seasonal changes
- Holiday interactions
- COVID-fatigue

Cheaper, faster testing or a vaccine could reduce the spread if widely deployed

Model forecasts may be less accurate because behavior is driving growth

- Models will continue to be useful for comparing policies and exploring scenarios

Case and hospitalization levels are high and growing rapidly



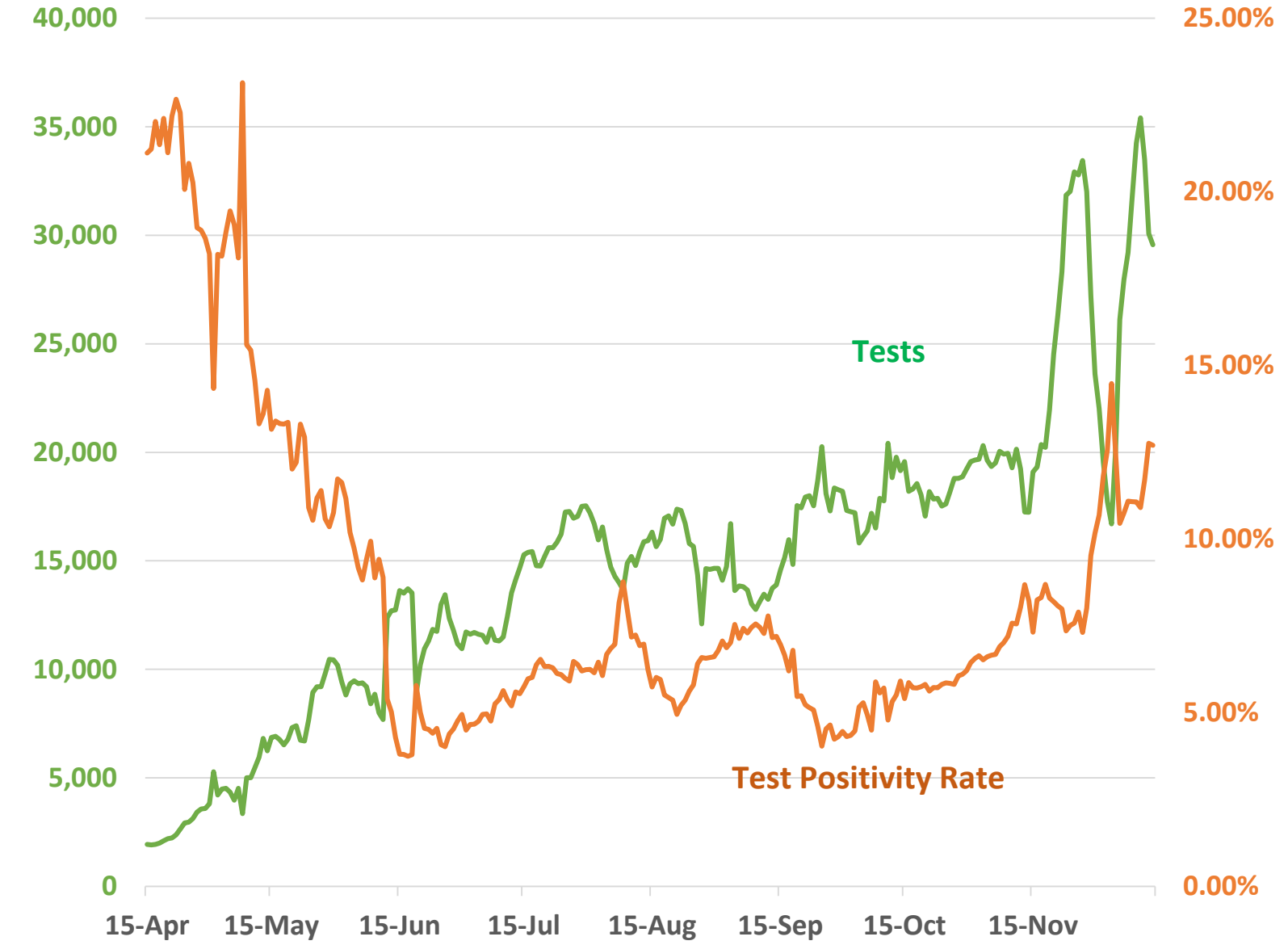
New confirmed cases are spiking and nearly reached 4,000/day on average

- Thanksgiving appears to have been a super-spreader event
- The daily case count (unaveraged) has declined for the last three days and may indicate a peak
- This decline could be evidence of a peak or due to insufficient testing

Currently hospitalized cases have risen above 2,300

- Hospitalizations are likely to continue to increase by a similar magnitude to the case rate (more than 30%) in the next week or two

Testing was interrupted by the Thanksgiving holiday but remains high



Tests per day have moved over 30,000

- There was a dip in testing following Thanksgiving, but levels have remained high

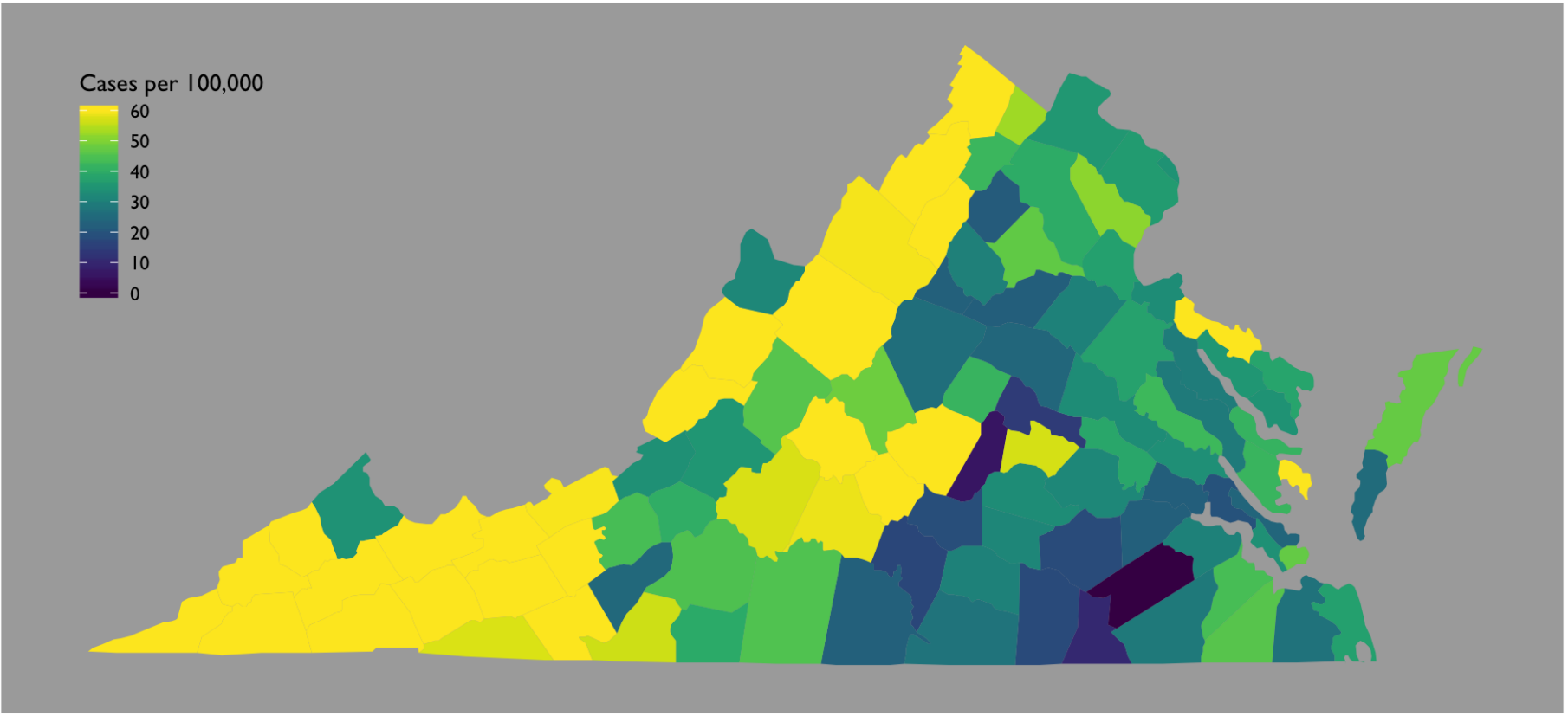
The test positivity rate has risen to 12.7 percent

- Five percent is a suggested target
- At this rate, the case count levels are likely to be less reliable

Case levels remain high statewide

CASE COUNT

Source: VDH



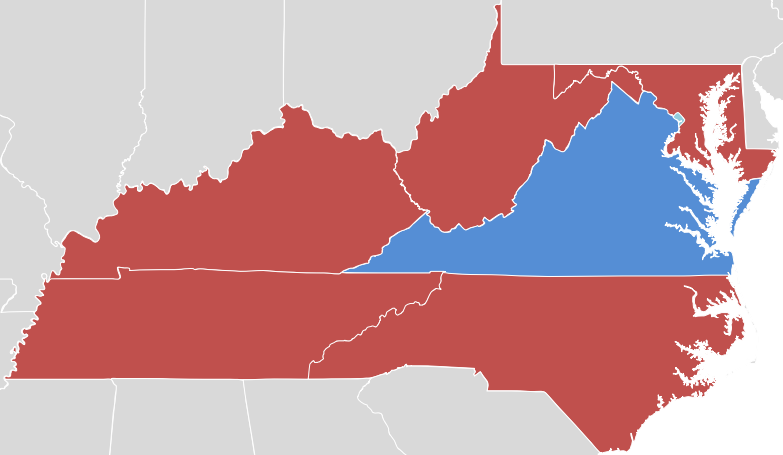
Yellow indicates at least 60 cases per 100,000

Counties across the Commonwealth saw increases

These data were updated December 15th and represent a seven-day average of the previous week

The post-Thanksgiving spread was worse in some states than others

Over the last 7 days, Virginia had 44.0 (+25% from last week) new confirmed cases per day per 100,000



Very high case loads (>20):

- Tennessee (116.2 new cases per 100k, +62% from last week)*
- Kentucky (71.3, -5%) *
- West Virginia (65.9, -0%)
- North Carolina (57.2, +21%)*
- Maryland (46.4, +21%)
- District of Columbia (34.8, -3%)

*Test positivity rates above 10%

High case loads (10-20): None

Lower case loads (<10): None

These data were updated December 15th and represent a seven-day average of the previous week

We've been monitoring recent, relevant literature

Lemieux et al. sequenced 772 complete SARS-CoV-2 genomes from the Boston area and performed a phylogenetic analysis to understand the pattern of spread

- They identified 112 introductions of the virus, but most resulted in a single case in the sample
- There were two super-spreader events (outbreaks at a conference and a nursing home) linked to three genomes, which accounted for approximately 85% of the cases
- This type of analysis could be useful in understanding the patterns of spread within Virginia

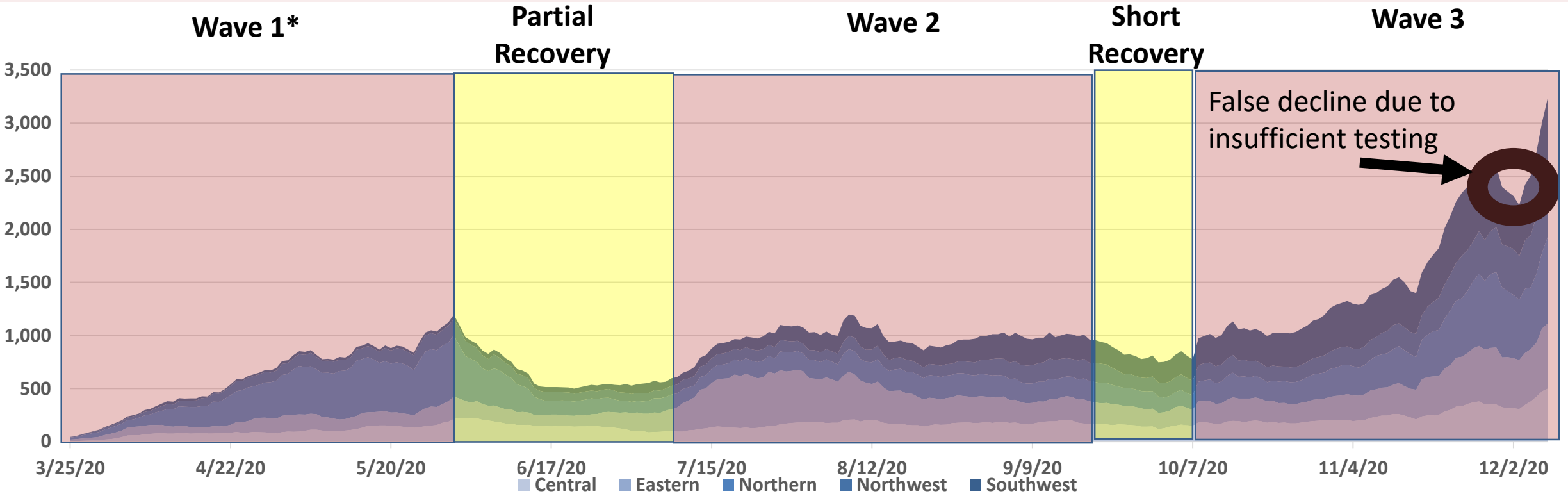
Bubar et al. modeled different vaccine prioritization strategies by age and other characteristics

- They estimate that vaccinating those aged 20-49 years would minimize the total number infected but that lives lost would be minimized by prioritizing those over 60 years of age
- Further, using serological tests to delay vaccinating those with antibodies further reduces deaths and total infections

Waxman et al. used a tracking survey to monitor economic well-being during the pandemic

- In mid-September, 40 percent of parents living with children under age 6 reported a loss of income or employment during the pandemic
- 23 percent of parents reported food insecurity and other stressors such as difficulty paying utilities (13 percent) or rent (12 percent))
- 32 percent of families with young children reported unmet need for health care for a child due to COVID-19 and 46 percent for any family member

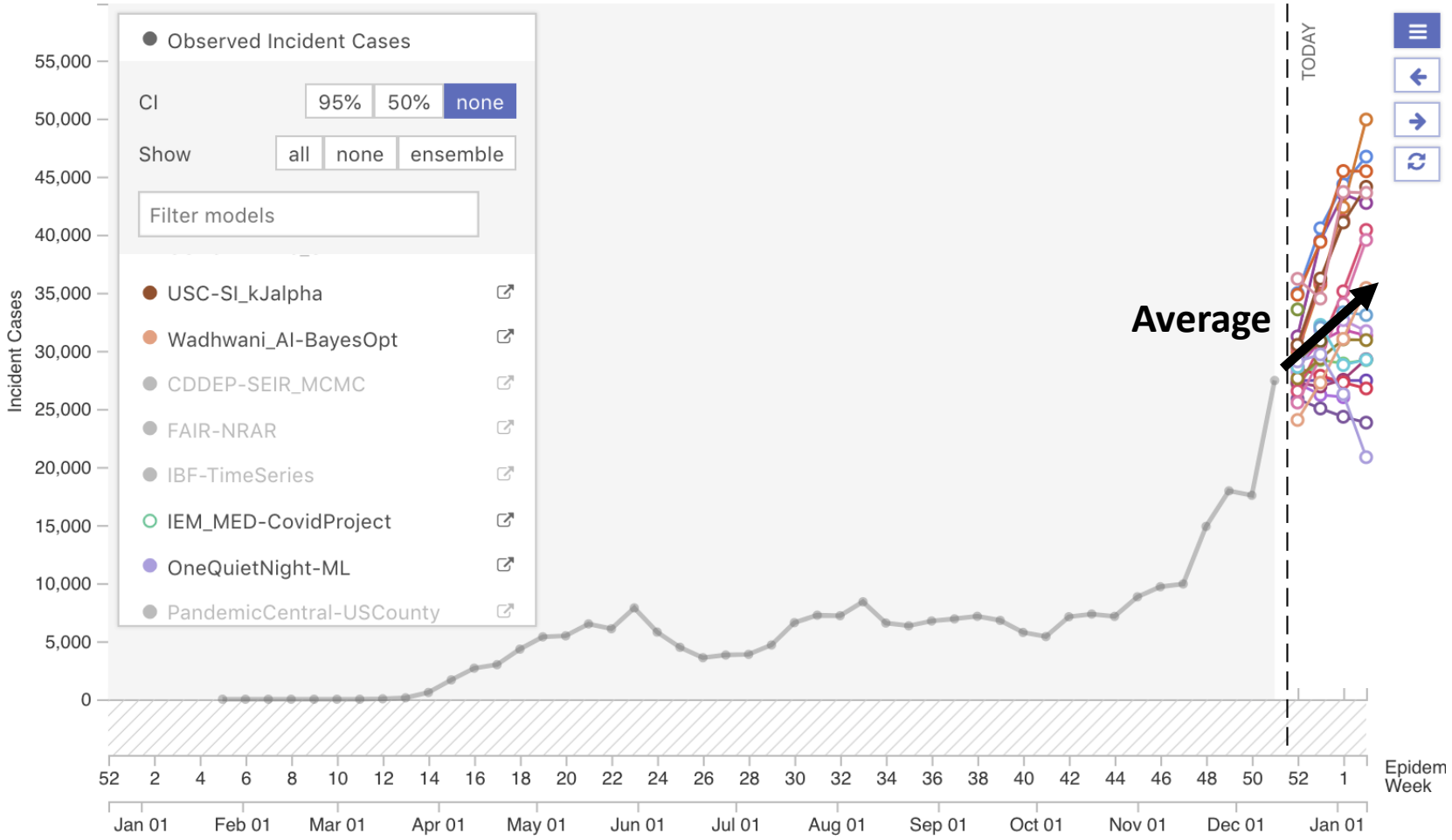
Each wave of cases has been centered in different parts of the Commonwealth



- The initial wave was concentrated in the Northern region*
- There was a partial recovery when cases in the Northern region dropped
- In mid-July, cases grew first in the Eastern region and then, beginning in August, statewide
- Statewide levels declined slightly, with a dip in the Eastern region in late September
- A new wave began in the Southwest region early in October, and previous highs have been surpassed in each region

*Testing was insufficient for accurate counts during the first wave

Forecasts for cases vary, but average to a rapid rise



Note: SEIR-type models have been cut from this figure due to poor fit
Source: COVID-19 Forecast Hub, https://viz.covid19forecasthub.org/
Accessed December 15th

There is substantial variation in the case forecasts

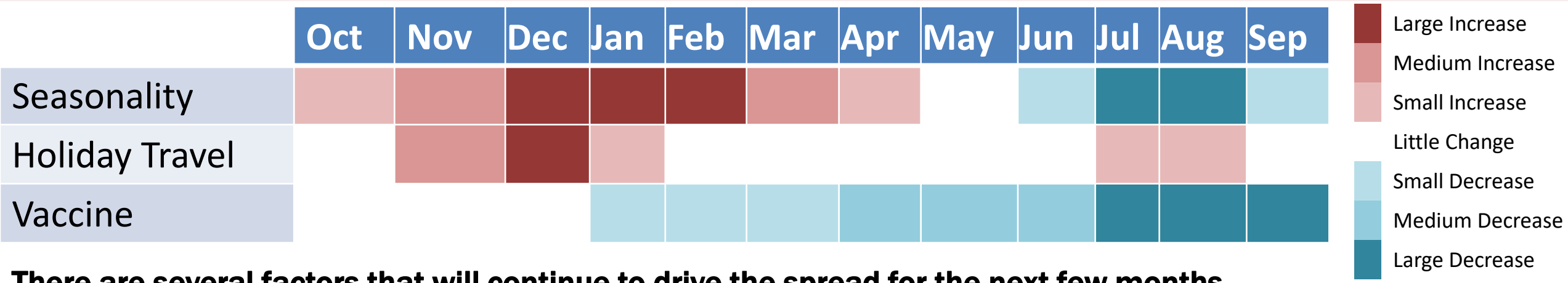
- The model "average" is for a rapid increase for the coming weeks

The mechanisms driving the spread at this stage are very different than in the early stage

- Initially, people did not change their behavior, so COVID spread exponentially
- Increased tele-work, changing weather, the return of in-person instruction, and other factors changed the pattern of spread
- These new patterns require the models to evolve

There may have been a gap in testing over Thanksgiving that could cause problems for models

There are several triggers that could lead to increased spread



There are several factors that will continue to drive the spread for the next few months

- Seasonal effects for COVID-19 appear to be driving spread as it gets colder
- Holiday activities appear to have increased spread

The first doses of a vaccine are now available but not in quantities to meaningfully reduce the spread

- People may scale back preventative behaviors (such as distancing and mask wearing) too soon

There are likely to be long-term repercussions that need planning and preparation to mitigate

- Nearly 300,000 Virginians have had confirmed cases of COVID, and it could be more than a million by the end of 2021
- Mental health problems may persist, particularly among medical professionals and those directly affected
- Following the 1918 pandemic, there were higher rates of disability, mental illness, and other conditions

The risk of spread during holiday gatherings will vary by region and group size

Estimated likelihood at least one person has COVID by group size and region

Size	Central	Eastern	Northern	Northwestern	Southwest
5	10.6%	10.1%	12.3%	14.5%	18.2%
10	20.1%	19.1%	23.1%	26.9%	33.0%
15	28.6%	27.3%	32.5%	37.5%	45.2%
20	36.2%	34.6%	40.8%	46.6%	55.2%
25	43.0%	41.2%	48.1%	54.3%	63.3%
30	49.0%	47.1%	54.5%	60.9%	70.0%

We used the regional COVID prevalence to estimate the risk that at least one person would show up to a holiday gathering infected with COVID depending on the number of attendees

- Cross-border travel could raise the risk

In the Southwest, more than half of events with 20 people would be expected to have at least one attendee with COVID

- The odds are slightly lower for most of the rest of the Commonwealth

The risk may be substantially larger by next week

Note: Assumes risk is based on 14-day case rate where only 25% of cases are detected and group members are randomly sampled from the region

Source: Author's calculations using data from COVID-19 Forecast Hub, https://viz.covid19forecasthub.org/ Accessed December 15th

Discussion and Questions